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## WEAR AND TEAR, AND DESTRUCTION OF IRON RAILS.

We had hoped that ere this we should have received from some of our correspondents a review of Mr. Ellet's communications on "the cost of transportation on railroads." In these there is much in which we concur; but there is, on the other hand, so much of error mixed up with the truths that they contain, that it is extremely desirable that some practical engineer, who has constructed and managed *railroads*, should review them, and inform the readers of the Journal, many of whom are large stockholders in their undertakings, where the views taken in Mr. Ellet's papers are correct, and where erroneous.

On one point it seems to be generally conceded that Mr. E. has adopted most exaggerated views. We mean in relation to the wear and tear and destruction of iron rails. This has been hitherto much greater *apparently*, than it is *really*, from the disposition of railroad companies, both in England and America, to progress in the improvement of their superstructures with the increase of their business, which has led them often to substitute a heavier rail for a lighter, long before the latter had given out, and in some cases even before it was materially injured. It is obvious, however, that whatever may have been *hitherto* a fair allowance for the wear and tear of iron, a very small one comparatively will be sufficient *hereafter*, for the following reasons:

1st. The value of *slow motion* for freights is now beginning to be generally understood, and the wear and tear and destruction of rails, occasioned by the passage of a train over a railroad, is much more than proportionally diminished with every diminution of speed.

2d. The locomotives now being introduced for freights, with much more adhesion, and, in consequence, much more capability than the old, have their weights more equally diffused, and *less on a single pair of wheels* than the old, and the motion of a train over a road, drawn by such a locomotive, is, therefore, much less injurious.

3d. While by the use of these effective, but slightly oppressive machines, at slow motion, the passage of a train over a railroad is much less injurious than it formerly was, inasmuch as the injury to the rail (that arising principally

ly from the passage of the locomotive and not of the cars,) is but little more for a long than a short train, the amount of injury *per ton* conveyed is still farther diminished compared with what it has been, *in consequence of the increased length of trains.*

For the above reasons it is obvious that Mr. Ellet's calculations, as to the wear and tear of railroad iron, per ton conveyed, deduced from roads on which high speeds, engines with great weight on a single pair of wheels, and short trains, are run, must necessarily be immensely exaggerated, when applied to the Reading railroad, on which, if we are correctly informed, 8 wheel engines, at a moderate velocity, draw trains averaging 160 tons nett, and on which, it is believed, that engines of the same weight with those now employed, so constructed as to have the benefit of their whole adhesion, and with the weight equally divided on all the wheels, (so as to have but little more weight on a wheel than the weight on an ordinary car wheel,) may draw 300 tons. With such engines, and we have no doubt they will be ere long introduced on the Reading and other roads, the iron of railroads may be expected to last as long, with slow transportation on locomotive as on horse power railroads, and on the latter the wear of a well made *edge rail* may be considered so small an item, as to be scarcely worthy of consideration.

We have designed in the above remarks only to advert to the subject noticed in them, by way of inviting the attention of some intelligent and practical professional gentleman to it, and to the other elements of the cost of transportation on railroads considered in Mr. Ellet's communications. We have indeed to regret that those members of the profession of civil engineers who could do most to enlighten the public mind on subjects connected with their profession, have but rarely listened to our appeals to them. We shall continue to hope, however, that this may be more the case hereafter than it has been heretofore, and that those whose experience is greatest in their profession may be willing occasionally to present through our columns their views on important professional subjects in relation to which it is desirable that the public mind should receive correct impressions.

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BALTIMORE AND OHIO RAILROAD—TRANSPORTATION OF HEAVY FREIGHTS.

Through the politeness of B. H. Latrobe, Esq., chief engineer, we have received a pamphlet, entitled "Two replies of the Baltimore and Ohio railroad company, to interrogatories propounded to the said company by the house of delegates of Maryland." The main object of the inquiries appears to have been to ascertain the *rates per ton* at which "the railroad company would engage to transport coal, iron, etc., from Cumberland to dam No. 6, provided an arrangement be made for such transportation to last for two, and also for twelve years, or permanently." To these, and other inquiries, the company replied, under date of 1st February, 1844, as follows, to the 1st and 3d inquiries—the answer to the 2d, 4th and 5th are here omitted, as the whole subject is fully answered in the reply of the company.

through their able president, Louis McLane Esq., in answer to a second call from the house of delegates, which, with the accompanying estimates, and statements, we give at full length.

1st inquiry. What is "the lowest rate of toll per ton per mile at which the company would agree to transport *coal, iron, etc.*, from Cumberland to dam No. 6, etc.

" 1st. That, provided a satisfactory arrangement be made within the ensuing twelve months, for the transportation of not less than 105,000 tons of coal annually, in equal daily quantities, during the canal season, assumed to be 250 days, from Cumberland to dam No. 6, to continue for twelve years or permanently, this company will engage to transport that amount, or any greater quantity not exceeding 500,000 tons as aforesaid, between those points at  $1\frac{1}{4}$  cent per ton per mile."

2d Inquiry, Requests a "statement of the relative cost of transportation by means of the railroad and canal from Cumberland to Georgetown, and by the canal alone, if finished," to the latter place.

" 3d. That this company decline to assert positively the lowest cost of transportation by the canal alone, if finished from *Georgetown* to *Cumberland*, but assuming such cost to be, as stated in the report of the canal company of the 16th of November last,  $1\frac{254}{1000}$  of a cent per ton per mile, the relative cost of transportation by means of the railroad from *Cumberland* to dam No. 6, and thence by canal to *Georgetown*, and by the canal alone, if finished from the same to the same, will appear as follows:

" Tolls and charges on railroad to dam No. 6, 45 miles at $1\frac{1}{4}$ cent,	60
" Tolls and transportation on the canal from dam No. 6 to Georgetown, 136 miles at $1\frac{254}{1000}$ cent per mile,	$1\frac{70}{2}$
	<u><math>\\$2\ 30\frac{1}{2}</math></u>

" The cost of transporting a ton of coal from Cumberland to Georgetown by the canal alone,  $18\frac{1}{4}$  miles, at the above rate of  $1\frac{254}{1000}$  cent per ton per mile,  $\$2\ 31\frac{1}{2}$

From the estimates here given, which have unquestionably been made with great care, it will be seen that heavy freights may be carried on a railroad at very low rates, and at a fair profit—where the trade is regular and certain.

These "replies" are from practical men who have been long in the school of experience—and will be, by many, deemed conclusive answers to Mr. Ellet's theory in relation to the wear and tear of iron rails.

*Office of the Baltimore and Ohio railroad company,*  
*February 15th, 1844.*

*To the honorable the speaker of the house of delegates:*

Sir: I had the honor to receive on the 12th inst., the order of the house of delegates passed on the 10th, and having at the earliest day practicable submitted it to the board of directors of this company, I am authorized to transmit the following reply.

In the first place, the board desire it should be distinctly understood that the investigation into which the house of delegates have been led, has been without their prompting or knowledge, and that in responding to inquiries into their resources and business, which, by exposing in detail the course and results of a single branch of their operations, may possibly lead to erroneous inferences in respect to others—without a like opportunity of explana-

tion—they yield only to a sense of respect due to the legislature of the State having so deep an interest in the trade and revenues of the road. The sequel of this present answer will satisfactorily show that the board need have no other objection to the amplest exposition of their credit and resources, and of the whole range of their transactions, on any other ground than that already indicated.

The board have at no time heretofore deemed it expedient or desirable to make expensive preparations for the transportation of any considerable amount of coal from the mines in Allegheny county. It has been quite obvious to them, as indeed they must presume it will be to all, that without the facilities of railroad communication between the mines and Cumberland, the article could not be brought to the latter point in quantities sufficient to warrant a large expenditure in providing means of transportation by any channel whatever. Up to this period the ultimate route of the Baltimore and Ohio railroad from Cumberland to the Ohio river is too indeterminate to authorise any attempt to extend it to any part of the coal region, and it is only recently that the board have seen any evidence of the existence, in any other quarter, of the capital sufficient either to construct a road to the mines, or to develop, except in a partial degree, their resources. It would be manifestly unwise in this company, or, as it may be presumed, in any authority whatever, to venture upon a large expenditure to acquire the capacity to accommodate a particular branch of trade, without at least some reasonable assurance that after the capacity should be acquired, sufficient trade would exist to employ it; and this consideration is particularly applicable to the operations of the railroad, inasmuch as the greater part of the preparations necessary for the transportation of coal would not be needed, and could not be advantageously employed in any other business.

This board, moreover, after thorough investigation of the subject in all its bearings, have placed no great confidence in the expectations founded upon the rapid and extensive developement of the coal of that portion of the State. If the requisite capital for the purpose can be commanded, they have been unable to discover any evidence that the demand for consumption will be such as to authorize, on their part, at least, any great preparations for engaging in the trade. They have become convinced, on the contrary, that many years must elapse before the demand will require more than 100,000 tons in any one year, whatever facilities of transportation may be afforded. It is to be observed also that to justify the railroad company in engaging extensively in the transportation of coal, at such rates as would bring it to market upon equal terms with coal of other States, it would be necessary that the trade should be large in amount, and of certain and regular supply throughout the year; of which, up to this time certainly, there has been no satisfactory assurance. Of the capacity of the company, with those advantages, to engage in the transportation of coal, at rates extremely profitable, and at the same time so low as to exclude the apprehension of rivalry from other works—according to any rate of charge at present known—the board have never doubted. The estimates accompanying this answer, and the large margin of profit which they exhibit upon the terms assumed, will show that if the board would be content with a nett profit of six per cent. upon the capital employed, it has the capacity to engage in the trade from the mines to the city of Baltimore at rates below any other mode of transportation at present known. The indisposition of the board, therefore, heretofore to engage in the transportation of coal, has proceeded from no other apprehension than the want of certainty and regularity in the amount; and on this ground they have preferred waiting events, and to test the practicability of develop-

meats so confidently predicted by others; with entire confidence, at the same time, that if those expectations should be realized and the trade in coal become sufficiently regular and certain, they could, at any time, engage in the transportation of it to Baltimore without danger of serious competition with any other rival.

Previous to the order of the house of delegates of the 25th of January, however, the board were officially informed by the president of the Maryland and New York iron and coal company, that he had procured the requisite funds for the construction of a railroad from the works of that company to Cumberland and was anxious for the completion of the road in the shortest possible time. The same officer also verbally communicated his desire to adopt the Baltimore and Ohio railroad to Baltimore for the transportation of coal and iron, if this company would engage in the trade at such rates as would enable him advantageously to do so. The investigation to which this application led only confirmed the opinion of the board that they might engage in the transportation with great advantage to the stockholders, and upon terms which, considering the speed at which they could perform the business, and the superiority of the Baltimore market, he might be well content to accept. Under such circumstances, they felt an obligation not to withhold their aid from the development of the resources of that important region. The order of the house of delegates of the 25th January, therefore, came while investigations into the practicability of arrangements for this purpose were actually in progress. A few days subsequent to the answer of the board to that order, the president of the Maryland and New York iron and coal company submitted a further and specific proposition; and it may be proper to remark, that in this proposition that company, of acknowledged means and capacity, does not appear to contemplate a greater amount of transportation than 52,500 tons per annum for a period of five years, and that not of coal only, but of "coal, pig iron, bar iron, fire bricks, castings, and other manufactures of iron." The object of the proposition was to ascertain the terms upon which this board would transport that amount from the mines to Baltimore, if the Maryland and New York company would make a railroad from the mines to the depot at Cumberland, and enter into an agreement for five years to furnish a freight, for one train of cars, supposed to transport 175 tons per day for three hundred days in the year.

In answer to the proposition, this board have offered to enter into an engagement to transport that amount of freight, in the manner proposed, from the mines to Baltimore, at one and one-third cent per ton per mile, a distance of 188 miles, with ten cents per ton for transportation through the streets of Baltimore; and one cent per ton per mile for 188 miles in addition upon manufactured iron, when required to be transported in house cars; the Maryland and New York company to load and unload the cars. An official estimate, forming the basis of this offer upon the part of the company, and showing the results of the operation, is herewith submitted, marked D.

I have now to add that since the preparation of this reply, a communication has been received from the president of the Maryland and New York iron and coal company, announcing the acceptance by that company of the foregoing offer; and stating his readiness to conclude a formal agreement to carry out the arrangement.

With these remarks, which have been deemed ~~proper~~ for a full understanding of the whole subject, I proceed to a more particular reply to the several questions propounded in the order of the 10th instant.

1st. The terms "satisfactory arrangement," in the answer of the board of the 1st instant, are to be understood to require a reasonable assurance that

the amount of transportation for which the company would be compelled to qualify itself, should in good faith be furnished; and with such regularity and punctuality, during the period assumed, as would authorize the board to engage in it at the low rates proposed.

If such reasonable assurance could not be given by those who are interested in the trade, and who are seeking the means of reaching the market, it is not perceived upon what grounds they can with propriety demand a large expenditure of money for the preparation of any means of transportation.

It has already been remarked that without a railroad communication from the Frostburg mines to Cumberland, it is obviously impossible that the resources of the former can be sent forward in quantities to justify any considerable preparation of any kind; and it is not to be supposed that these works will be constructed until the market shall demand an adequate supply, and the capital be provided to meet such supply. As the basis, therefore, of any "satisfactory arrangement" contemplated in the former answer, the board would require,—*First*, that the necessary communications from the mines to Cumberland, should be constructed; *Second*, that adequate capital for working the mines to the proposed extent should be provided; and *Third*, that responsible parties, engaged in the business, should enter into an agreement to furnish the requisite amount upon the terms and in the manner proposed. The board would take it for granted that responsible parties would not perform these things without a reasonable certainty that they would find a market for the products of their labor and capital; and until they can have such certainty they would not be justified in demanding extensive and unnecessary expenditures, of which they could not avail themselves.

2d. For the charge of  $1\frac{1}{2}$  cent per ton per mile, as specified in their answer of the 1st instant, the board contemplates a ton of 2,240 lbs.

3d. In reply to this answer, and in illustration of other parts of this answer I herewith submit a report and estimate of the superintendent of machinery and repairs, approved and confirmed by the chief engineer of the company, marked B. From this it will appear that to provide the necessary "conveyances, cars and machinery, to accommodate a trade of 105,000 tons, annually, between Cumberland and dam No. 6," it will require the sum of *eighty-seven thousand dollars*, and for additional sideling tracks at dam No. 6, *three thousand dollars*, making together *ninety thousand dollars*; and "for the accommodation of 500,000 tons, annually, between the said points," it would require *\$450,000*, including, of course, the previous sum of *\$90,000*.

4th. Under other circumstances, it might be a sufficient reply to the question to state that the company expect to derive the means to enable them to engage in the transportation they have contemplated, from those sources from which all railroad companies derive the means of maintaining their works and carrying on their trade; and that this board is quite incapable of venturing to engage in any branch of trade, without a just reliance upon their ability to fulfil their engagements. Upon the present occasion, however, the board desire to give a more particular answer.

In their annual report of October, 1842, the board stand pledged not to apply any portion of their annual revenue to the extension of the road west of Cumberland, without at least the consent of the stockholders; and, adhering to the determination to prosecute their work with the least possible delay to the Ohio river, they would deem it unwise to use any part of their fund appropriately applicable to the extension of the road, for the purpose of increasing their machinery for the accommodation of trade from the present terminus.

The trade upon the Baltimore and Ohio railroad, however, is obviously on the increase, and in the course of the next year may require some augmentation of its machinery for the accommodation of the regular and accustomed business. For this purpose, and for any new trade in which the board may decide to engage, the ordinary and legitimate resources are the *credit* and *revenue* of the company. From one of these the capital needed for the contemplated transportation of coal must be drawn, and that either will prove entirely adequate, is not to be doubted.

Of the solidity of its credit, this company has just reason to be proud; and they have the gratification to know that under its financial arrangements, the improved economy in its operations, and the continual increase in its business, its credit is daily becoming better entitled to public confidence. It has, at all times, promptly complied with its obligations to the State, and to individuals; its ability in the future is not less than in the past; and its bonds now outstanding for the debt incurred on account of the Washington road, are in demand in the market at a premium of five per cent. If it may be assumed that capitalists will be found to advance the requisite funds for working the mines which are to yield the coal for transportation, and for the construction of the roads necessary for its conveyance to Cumberland; or if it be probable that the same facilities may be found to raise the millions requisite to provide other channels of conveyance, not merely dependant upon the developement of the trade, but in competition, as the estimates herewith submitted show, with a work in full operation, capable of transporting at as low a cost; the ability of this company to raise, upon its credit, some addition to its revenue, to be employed in a business certainly yielding a nett annual profit of not less than 20 per cent, will scarcely be deemed less probable.

The revenue of the company, should it be proper to use it, presents a resource equally available.

The nett revenue of the last year amounted to nearly \$280,000, and enough is already known to authorize the presumption that for the present it will not be less than \$300,000. Hence it will be clear, from the estimate already referred to, that to accommodate a coal trade of 105,000 tons per annum, from the mines to dam No. 6, little more than *four months* of the nett revenue will suffice; and that for the same amount of transportation from Cumberland to dam No. 6, a much less sum will be adequate. It is to be remarked also, that upon either amount, should it be drawn from the revenue, the stockholders will annually receive nearly 20 per cent. from its new employment, and one-third per cent. upon the entire capital of \$7,000,000.

Whether the board will resort to its credit or to its revenue, will depend upon the best view they may take of the interest of the stockholders, when it may become necessary to resort to either.

The conviction entertained by the board, of the progress and amount of the contemplated coal trade, if the supply for consumption should immediately require the transportation of 105,000 tons in one year, they are quite confident that after reaching that amount, whenever that may be, the annual increase from that time, may be accommodated from the profits derived from this branch of trade. It may well be supposed, that no one can be found so sanguine as to imagine that the consumption of this coal will at the end of eight years require the annual transportation of more than 500,000 tons; and upon this hypothesis, the statement herewith submitted, marked C, will show that the transportation of such amount at that period, as well as previous thereto will be maintained by the profits of this single operation, without further recourse to the revenue or the credit of the company. If, however, the board should, in any degree be disappointed in these expectations

—which they by no means apprehend—the deficiency, small as it must necessarily be, may be readily supplied from either of the sources already indicated.

5th. In reply to this question also the attention of the house of delegates is particularly requested to the estimates already referred to, and marked B; which were taken as the basis of the previous answer of the board of the 1st instant.

These estimates and the expenses of transportation are in every instance derived from the *actual experience*, not only of other companies but of this company; an experience in our operations of many years, and from their uniformity, and the economy we have been enabled to introduce, all estimates founded upon them possess, in all our calculations, the most satisfactory authority.

It is to be observed also that the principal means by which we are enabled to engage in the transportation of coal at the low rates referred to, are found—1st, in the use of the approved heavy engine, possessing nearly triple the capacity of those formerly, and now in use by the company—2d, in the comparative cheapness of the description of cars, and the less weight they are required to have in proportion to the load they carry—and, 3d, in the amount and regularity and punctuality of the trade.

It may therefore be stated, that from Cumberland to dam No. 6, a distance of 45 miles, the cost per ton per mile of transporting 105,000 tons in 250 days of canal navigation, is estimated at  $\frac{1}{1000}$  of a cent. If the charge be  $\frac{1}{4}$  cent per ton per mile, the nett profit will be  $\frac{3}{1000}$  of a cent per ton per mile; and upon 105,000 tons transported 45 miles, or 4,725,000 tons carried one mile, it would be \$18,522, being upwards of 20 per cent. upon the capital employed, and more than one per cent. upon the entire cost of the road of 45 miles used for the transportation. Upon the same quantity transported from the mines to dam No. 6, and requiring a capital of \$102,000, the nett profit would be \$23,215, being nearly 23 per cent. upon the capital employed.

It will also be observed that the expenses of transporting 105,000 tons of coal from Cumberland to dam No. 6, include interest at 6 per cent. upon the whole cost of machinery employed in it, as well as every other item of cost arising out of the trade; and the estimate also allows one-fourth of a cent per ton per mile for the increased wear and tear of the road due to the accession of the additional trade. Regarding this specific transportation between the said points as no part of the general trade of the road, upon which all the present expenses of working it are charged, it was deemed unjust to charge the new trade with any part of the expenses already incurred, and which would continue, although the additional trade should not be undertaken; and, therefore, it is not doubted that one-fourth of a cent per ton per mile will prove ample allowance for the additional wear and tear it is intended to cover.

In any view, therefore, whether we regard the investment of the additional capital in the machinery alone, or in that and the road together, it is presumed that the transportation proposed will be considered "profitable."

6th. At two cents per ton of 2240 lbs. per mile, the company would be willing to transport coal from Cumberland to dam No. 6, at all times, without requiring a stipulation that it should be delivered in equal daily quantities; and would be willing to "increase its machinery for that purpose according to the growth and requirements of the coal trade;" provided such trade between those points shall be equal to 50,000 tons per annum, and the company not be required to transport more than 420 tons in one day. Or, if the trade should amount to 100,000 tons per annum, the company would

transport it in the same manner, and at the same rate not exceeding 840 tons per day.

7th. Since the opening of the road to Cumberland, in November, 1842, the rate for the transportation of coal has been two cents per ton per mile; and until there should be greater facilities for its conveyance from the mines to Cumberland, the company did not increase its machinery for the accommodation of this trade. The whole quantity of coal, other than that for the use of the company, taken from Cumberland upon the railroad to all points amounted to 5625 tons of 2240 lbs.; and all that was offered for transportation was not invariably carried when presented. There was occasionally also, "delay when other tonnage was seeking transportation." This was the consequence of an insufficiency of machinery to transport all articles offered for that purpose; and when it became necessary to choose between different articles presented at the same time, such as were perishable or most valuable, were preferred. Such, moreover, was the irregularity in the delivery of coal as to render its prompt transportation in many cases impracticable, even if the company had been better prepared for the trade. The limited means, during the past year, for the transportation of coal, was well known to the dealers in that article, who without any expectation of its immediate transportation, must have delivered it with full knowledge of the risk of delay.

8th. The highest ascending grade on the railroad, from west to east from Cumberland to dam No. 6, is  $26\frac{4}{5}$  feet per mile.

9th. In the recent answer to the house of delegates, it is stated, that upon a railroad from the mines to Cumberland, worked in connection with the road from Cumberland to dam No. 6, and with the same machinery, it will cost two cents per ton per mile on the former, and  $1\frac{1}{4}$  cent per ton per mile on the latter; because the road from the mines to Cumberland is but ten miles in length, and dependant for its revenue entirely upon the coal trade. On this account its general expenses would have to be borne entirely by that trade, inasmuch as it would derive no such aid as it yielded to the Baltimore and Ohio railroad from the travel, and transportation of burden, by which this road is now supported. It is, therefore, obvious that the charges cannot be the same on both roads, although worked by the same machinery, as it is supposed in the recent answer.

Of the two cents per ton per mile, the assumed cost on the road from the mines to Cumberland,  $1\frac{83}{1000}$  cent would be received by the Baltimore and Ohio railroad for transportation, and the remaining  $\frac{17}{1000}$  cent would belong to the proprietors of the former road; and if the road be supposed to cost \$150,000, and the expenses of repairs and management to be at the rate of \$600 per mile per annum, it would require a trade of 163,576 tons over its entire length, in each year to pay an interest of 6 per cent per annum upon the cost of construction. It might indeed be questioned whether the proprietors of a railroad from the mines to Cumberland would, for some time to come, be justified in charging so low a rate of toll as two cents per ton per mile, assumed in the recent answer.

I have the honor to be, sir,  
Very respectfully, your obedient servant, .  
LOUIS McLANE, President.

[ B. ]

*Estimates of the cost of transporting coal from Cumberland and from the Frostburg mines to dam No. 6, on the Chesapeake and Ohio canal—extracted from report of the undersigned, bearing date 31st Jan., 1844.*

1st. As to the cost of transporting coal from Cumberland to dam No. 6, by the Baltimore and Ohio railroad, distance 45 miles. This estimate contemplates the employment of loco-

motives weighing 20 tons, and of sufficient power to transport 30 cars carrying 7 tons each, or 210 tons of coal per train, and that three locomotives will be required to perform the work of two, and that the season of canal navigation will continue 250 days—cars loaded in one direction only.

ESTIMATED COST PER DAY OF TRAIN CARRYING 210 TONS COAL.

Interest on 1 1-2 times cost of locomotive and tender per working day, (the cost of engine and tender being estimated at \$10,000.)	\$3 60
Repairs and renewals of engine and tender at 9 cents per mile run with trains—90 miles per day,	8 10
Oil for engine and tender, 1 1-2 gallons, at 90 cents.	1 35
Fuel, 3 tons of coal at \$1 68 per ton,	5 04
Wages of engineman and fireman,	3 50
Wages for two breakmen, one at \$1 25, and one at \$1,	2 25
Interest per working day on 75 coal cars, at \$3 60 each,	6 84
Repairs and renewals of cars at 1 1-4 of a cent per ton per mile—of load hauled,	23 63
Grease for cars.	1 50
Making a total of	\$55 80
Being at a rate per ton per mile of	0 591 cents.
Add to this for wear and tear of road, bridges, etc.,	0 250 "
And for contingencies,	0 100 "

The total cost per ton per mile will then be 0 941 cents.

Two such trains as that above estimated (with less than which the trade could not be so economically conducted) would carry 105,000 tons of coal from Cumberland to dam No. 6 during the 250 days of canal navigation, which at two cents per ton per mile would yield a nett revenue of \$50,037 75 at 1 1-2 cents per ton per mile, \$26,412 75.

The amount of capital requisite to procure the machinery for two such trains would be \$87,000.

2d. As to the cost of transporting coal from the mines in the vicinity of Frostburg to dam No. 6, say 55 miles, engines, load, etc., as before—engines working two days and laying by the third for examination—average day's work of engines and attendants of train 73 miles.

ESTIMATED COST OF TRAIN PER ROUND TRIP OF 110 MILES.

Interest on 1 1-2 times cost of engine and tender per round trip, (cost of engine and tender as before.)	\$5 40
Repairs and renewals of engine and tender at 9 cents per mile run, with trains,	9 90
Fuel, 4 tons coal at \$1 per ton,	4 00
Oil for engine and tender 1 3-4 gallons, at 90 cents per round trip,	1 57
Wages of engine and fireman, per round trip,	5 25
Wages of two breakmen, one at \$1 25, and one at \$1 per day, per round trip,	3 37
Interest on 75 cars at \$3 60 each, per round trip,	6 84
Repairs and renewals of cars at 1 1-4 of a cent per ton per mile, of load hauled,	28 87
Grease for cars,	1 87

Total cost of train per round trip, \$67 07

Being at the rate of	0 581 cents per ton per mile.
Add to this for wear and tear of road, bridges, etc.,	0 250 "
And for contingencies,	0 100 "

And we have as total cost, 0 931 "

Amount of money required to procure the machinery to run two trains per day under the above system would be 102,000 dollars.

The quantity of coal transported would be the same as in the former case—105,000 tons.	
Nett earnings at 1 1-3 cents per ton per mile would be	\$23,215
" " 1 1-2 cents " " "	32,859
" " 1 3-4 cents " " "	47,927
" " 2 cents " " "	61,734

The cost of transporting a ton of coal from Cumberland to Georgetown, by railroad to dam No. 6, and thence by canal, will be as follows, viz:

First.—Supposing tolls and charges upon the railroad to be 1 1-3 cents per ton per mile, on 45 miles would be	\$0 60
And supposing charges for tolls and transportation on canal to be the same as as- sumed by the president and directors of the canal company in their report of the 16th November last, viz: 1 254-1000 cents per ton per mile, on 136 would be	1 70 1-2

Total cost of transportation, \$2 30 1-2

Second.—Should the charge upon the railroad be fixed at 1 1-2 cents per ton per mile, add to the above	07 1-2
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Total cost will then be 2 38

Third.—Should the charge upon the railroad be fixed at 1 3-4 cents per ton per mile, add the further sum of -	11 1-4
Total cost will then be	2 49 1-4
Fourth.—Should the charge upon the railroad be fixed at 2 cents per ton per mile add as before	11 1-4
Total cost from Cumberland to Georgetown will then be	2 60 1-2
Fifth.—Should the road be extended to the mines, add for transportation and charges from the mines to Cumberland—say	20
Making the entire cost from the mines to Georgetown,	2 80 1-2
The cost of conveying a ton of coal from Cumberland to Georgetown by the canal alone, at the rate above assumed, distance 184 1-2 miles, would be	2 31
Add to this the cost upon railroad from the mines to Cumberland, which upon a road so short as 10 miles, with no other support than that derived from the coal trade, and to be worked independently of the Baltimore and Ohio railroad can not be much, if any, less than	30
And we have as the cost to Georgetown, by railroad to Cumberland, and thence by canal,	\$2 61

Respectfully submitted by JAMES MURRAY,  
Engineer of machinery and repairs, Baltimore and Ohio railroad.

Baltimore, February 13, 1844.  
I have carefully examined the preceding estimates and have confidence in their sufficiency for the purposes intended. BENJ. H. LATROBE, Chief Engineer.

#### ANNUAL RETURN OF THE MASSACHUSETTS RAILROADS FOR 1843.

In presenting an abstract of the Massachusetts railroad reports for the past year, we have to regret that the information to be derived from the accumulated experience of years is much less than might have been expected—owing to the absence of much of the detail necessary to a correct understanding of railroad statistics. There is, however, one exception, which particularly deserves notice and commendation—we refer to the Western railroad company, which, following the plan of the last report, has given us again a full statement of all its expenditures, classed under various heads, and affording at a glance the cost of any one department of the business.

Before laying before our readers the usual tabular statement, we shall offer an analysis of each of the reports, with such remarks as may be suggested.

*Western Railroad.*—From this very voluminous report we notice briefly such matters as may interest the general reader. The receipts for 1843 exceed those of the previous year by \$61,194 23—a favorable indication of the prospects of this great work, as yet but barely entered upon its regular business. It is well known that the adoption of comparatively high or low fares has during the greater part of the last year, seriously occupied the attention of this corporation. From the report it appears that the determination of this question, as far as regards freight, was easily made—but that with regard to passengers a greater difference of opinion prevailed—owing to a want of co-operation on the part of the Boston and Worcester railroad company, the reduction of fare proposed was not as fairly tested as had been intended. The results are, however, strikingly in favor of the reduced rates. From the 12th of April to the 1st of December the fare for first class through passengers was reduced to two cents, and for first class way passengers to two and a-half cents per mile. The fare for second class passengers appears to have been about two-thirds of this. The reduction of fare has added most to the number of through passengers, and of these the increase is propor-

tionally greater for the second class, the number of which is more than doubled. The number of first class way passengers is but slightly increased while that of the second class has gained much more.

The whole *nett* tonnage of the road has increased a little more than fifty per cent, while the through tonnage has more than doubled. That this increase of business has not been unprofitable, we may judge from the fact that the number of miles run by all the engines has increased but about 11 per cent—10 per cent being the increase for the freight trains.

The report gives in detail the measures which have been taken to diminish the expenses of the company—these are chiefly directed to the reduction of salaries, and in some cases of the number of officers in the service of the company.

In comparing the expenses of 1843 with those of the previous year, several items are to be noticed as not included in former years, and, therefore, apparently adding to the expenditure of 1843—among these we notice \$6000 as a settlement for the *collision damages* of 1841. A reference is made to the connection with other railroads—of these it would seem that the Boston and Worcester railroad company receive most profit from the Western railroad, the share of that company from the joint business for 1843 being \$153,000. The arrangements at present existing are thought to be onerous to the Western railroad company, and are about to be revised.

The number of engines and cars has been augmented to meet the increased business of the road. Five locomotive engines have been added to the stock and three more are ordered.

The wood sheds are now sufficient for the protection of *upwards of 20,000 cords of wood*. The expenditure for this purpose, and for the supply of water for the protection of the bridge over the Connecticut and other property from fire, are made in the proper spirit, and come under the good old rule as the “ounce of prevention.”

Another item of expense of a novel character is deserving of notice—the erection of 5000 feet of fence to protect the road bed from snow drifts—the result is stated to be “highly satisfactory,” and this mode of protection will probably be extended. When we find under the head of *snow* the sum of \$11,867 45 expense for 1843, we can easily imagine the necessity of some defence against the attacks of this enemy.

The arrangements of the depot at Greenbush are completed upon a magnificent scale. By means of steam power, goods are transshipped with a difference of level of over 20 feet between the cars and canal boats. The unfavorable nature of the site has added to the expense of this and other necessary arrangements at the depot.

The Albany and West Stockbridge railroad has been completed at the cost of \$1,756,342 78.

In fine, we cannot but think that this most important work is destined to

become as profitable to its stockholders as it is already beneficial to the public. It is true there are serious difficulties to contend with—a mountain region with severe grades, subject to obstruction from snow in winter, costly depots, and heavy expenditures at various points. These are, however, fully counterbalanced by the value of the route and the constant growth of local as well as through traffic. The results, too, which have been attained, are for the first two years, everything being comparatively new and untried. No doubt a judicious economy and suitable regulations as to fare, together with an equitable arrangement with various connecting roads, will lead to a prosperous condition.

*Berkshire Railroad.*—This company has arranged matters so that the capital, \$250,000, shall exactly meet the cost of the road, depots, etc. It is now loaned for 7 per cent to the Housatonic railroad company, and no statistics can consequently be furnished by the owners of the road. The small incidental expenses are met by a fund appropriated to that purpose.

*Boston and Lowell Railroad.*—This company in the full tide of prosperity has given a very short and rather meagre report—at least as far as statistics are concerned. More than two-thirds of its revenue is derived from traffic, in connection with the Boston and Maine, Nashua and Lowell and Concord railroads.

A dividend of 8 per cent has been paid out of the profits of the last year.

The sale of the old iron has been completed, and the entire cost of the new having been formerly charged to repairs, the difference, together with balance of interest account, is taken from the cost of the road—which now stands at \$1,863,746 16. All calculations of annual expenses, based upon the previous reports of this company, will therefore need a large discount; it is hardly necessary to say that all estimates as to the wear and tear of railroad iron will need a like alteration.

*Boston and Maine Railroad.*—Since the last report, this road has been so far completed as to be in use throughout its whole length; the following statistics will, therefore, be of interest:

Amount expended in construction of road in

Massachusetts,		8431,592 15
do. do. New Hampshire,		<u>723,058 11</u>
Total,		81,154,650 26
Amount expended in engines and cars,		93,886 73
do. depot and other buildings in Mass.,	21,146 78	
do. do. New Hampshire,	<u>17,666 43</u>	
Total,		38,813 21
do. do. other miscellaneous expenses in Massachusetts,	45,914 85	
do. do. New Hampshire,	<u>45,734 67</u>	
Total,		91,699 52
Total amount,		<u>\$1,384,049 72</u>

Length of road in Massachusetts,	20,354 miles.
do. New Hampshire,	34,964 "
do. Great Falls branch,	2,936 "
Total,	<u>58,244</u> "
Length of road in side tracks,	3,092 "

Number of planes, 130—of which 32 are level, 57 ascend and 40 descend from Wilmington. By a singular mistake, the report makes these grades 1000 feet per mile, we presume that ten feet is intended.

The greatest curvature is 1050 feet radius; the average width of grade 14 feet.

"The manner in which the superstructure is laid is as follows:

"The earth excavations and embankments are leveled off and one and a half foot of sand, or gravel, is then filled on to the road; the sub-sills of plank are then laid longitudinally, and the sleepers of chestnut, cedar or backmetac are laid transversely, partly two and one half feet, and partly three feet apart. Iron rails of the T pattern are then laid, supported at the joints by cast iron chairs, and spiked to the sleepers; sand or gravel is then filled in between the sleepers.

"The Maine, New Hampshire and Massachusetts railroad is an extension of the Boston and Maine railroad, through Berwick so as to intersect the Portland, Saco and Portsmouth railroad at South Berwick, in Maine, and the Boston and Maine railroad have contracted to pay the stockholders of the Maine, New Hampshire and Massachusetts railroad company the same dividends per share as is paid to their own stockholders. By virtue of this agreement there has been received by the Boston and Maine railroad the funds of the Maine, New Hampshire and Massachusetts railroad company, not required to construct their road, and their surplus funds will, upon the union of the two corporations, be applied to the payment of the debt of the Boston and Maine railroad."

The above named roads have likewise entered into a contract for the mutual advantage and co-operation of their respective lines.

Although this road has not been completed throughout, and in operation for the whole year, a dividend of 6 per cent. has been declared on last year's profits.

*Boston and Providence Railroad.*—During the past year 18,598 new sleepers have been laid, about 13,000 will be required this year—the road is said to be now in better order than for several years past.

The earnings on the Dedham branch are said to be "very satisfactory," and fully to compensate for running a locomotive engine for the accommodation of the inhabitants of Dedham.

An arrangement has been made with the lines from New York, by way of Stonington and by way of Norwich, by which the rates of fare for freight and passengers for both the lines are the same, and the receipt equalized, except that the line transporting an excess receives a reasonable compensation therefor.

The amount charged to the account of construction has been increased this year by about \$2000, but will shortly be diminished by the sale of property worth over \$15,000. A dividend of 6 per cent. has been paid for the past year.

*Boston and Worcester Railroad.*—Since the last report the second track has been laid upon this road, and to meet this and other expenses, 2000 shares have been created and taken up proportionally by the stockholders. The capital is now \$2,900,000.

The second track is laid with a heavier rail than the first, and in a more substantial manner, being therefore better adapted to the present heavy traffic of the road.

Two trains run daily, in connection with the Western railroad, to and from Albany, and one train daily connects with the Norwich and Worcester railroad, forming a daily communication to and from New York. A permanent arrangement has been made with the Norwich and Worcester railroad company, by which the joint transportation of passengers and merchandize over both roads is regulated on terms said to be "mutually advantageous and satisfactory, and also advantageous to the public."

Beside the regular through trains, three trains run daily in each direction between Boston and West Newton, affording accommodation to the vicinity of the city, and relieving the regular trains of their heavy loads at this end of the line. By these arrangements it will be seen that forming important connections, this is preparing to meet the vast trade to which it is destined and which, in a great measure, it already receives.

(To be continued.)

For the American Railroad Journal and Mechanics' Magazine.

ON THE CAUSES OF THE GENERAL FAILURE OF CANALS IN AMERICA.—BY W. R. CASEY, CIVIL ENGINEER.

It is obvious that some inherent defect must exist in American canals generally to have brought about the present deplorable results. It is true that nearly all these works have been constructed by the governments of the different States and Provinces and under all the well known disadvantages of that system; and, we might argue with some reason, that in the hands of private companies they would have been more efficiently as well as more cheaply completed, owing to the superior sagacity, integrity and skill of the directors and engineers of works carried on by private enterprise. Thus it is no uncommon thing to see a president, board of directors and engineer at the head of a small private work, costing two or three hundred thousand dollars, in every respect—character, skill and wealth—incomparably above the government commissioners, boards of works and their engineers, entrusted with the disposal of millions. But admitting all this, it would merely show that the cost of the works had been too great, while in practice we find, that besides this obvious disadvantage, they labor under the still greater one of having—practically speaking—no income, as in the case of the Chenango canal, which has a gross income of about \$13,000, on a cost of 2½ millions. The following extract from this *Journal* for 1839, p. 363, gives the true solution:

"In some States, the grand argument will be, that if they can only complete the works commenced, a revenue is immediately certain, which will render taxation to pay the interest unnecessary. That the completion of these projects will make the fortunes of many individuals, is well known, but, for the permanent interests of the State, the only plan is, to sell out at once with the present comparatively trifling loss. It is impossible to pay too much attention to the fact, that the greater part of the works projected by the governments of the different States are not such as will ever be of any essential benefit, and when we add to this that they are constructed at twice the cost of similar works in the hands of companies, are generally much inferior in execution and always managed and repaired in the

most inefficient manner—we shall be at no loss to account for the present condition of State works in general." (See also Civil Engineers' Journal, vol. iii, p. 124—London.)

The only canals which now yield a surplus are the Erie and Ohio canals, owned by the States of New York and Ohio, and the Delaware and Hudson and Schuylkill canals, owned by private companies in New York and Pennsylvania.\* The Larkine canal in Canada was productive, but being now in the hands of a "board of works," is not likely to remain so much longer. Its "enlargement" has been already commenced. Volumes would not convey to the citizens of New York all which that single word conjures up.

Had the Erie and Ohio canals been left to their own resources their stock would never have been at par. The former received six millions from tolls during the first four years of its existence—nearly its entire cost—and the comptroller shows, doc. 40, p. 45, 1844, that, charging and allowing interest, the balance is \$4,179,291 46 against the canal—omitting, of course, the enormous sums spent on the enlargement. The canals of Ohio have been, and continue to be supported by direct taxation, and that alternative has become necessary here for a few years at least. The two private canals above alluded to lead to the anthracite region of Pennsylvania; one, the Schuylkill canal, has made immense dividends, but the stock has fallen greatly, and the toll has been reduced to three mills per ton per mile! the other is successful.

The Erie canal, though conferring considerable benefits on the country, has also exerted a powerful influence in a contrary direction, and for five months of each of the last four years it has been complained of—each succeeding year more bitterly—as an intolerable nuisance, injuring alike the western producer and eastern consumer by its hideous monopoly. Canals intended for the coal trade are comparatively little affected by the long winters of New York and northern Pennsylvania; but, canals drawing their main income from the country through which they pass, and, still more so, those depending on the trade of the lakes, have their usefulness greatly impaired by being closed during the winter months. This objection is insuperable, becomes stronger every year, and will, in my opinion, prevent the undertaking of any more canals in the country, north of Philadelphia at least.

Again, the grasping spirit in which many canals have been projected has been ruinous to their prospects for any reasonable period. The enlarged Erie and the Brobdignag canals of Canada were each to bear to the ocean the trade of the west; the Lehigh and Schuylkill canals were each to furnish the avenue for the coal trade of the country. But we find the coal as well as the western trade flowing through numerous channels already, and many more will soon be added. In England, canals are generally successful, but though doing an immense business they are very small, some of the most important having locks only eight or ten feet wide. Again, the capital

\* The canal round the falls of the Ohio is of course omitted.

invested in all the private canals in the kingdom is only £5,775,000 sterling, about the sum expended on canals in New York, little more than the cost of the canals of Pennsylvania, and about twice the probable cost of the canals of Canada. What a contrast between the views of those investing their own money, and the conduct of those who expend the money of the public! Eighteen millions of people, with wealth, industry and enterprise unparalleled in the annals of mankind, expend in fifty or sixty years about thirty-four millions of dollars: six millions in Pennsylvania, New York and Canada, with wealth comparatively nominal, contrive to lay out about sixty millions of dollars in one fourth the time. The capacity of these little English canals is immense, their cost and management comparatively slight and easy.

A boat will carry about 30 tons, and as one of the old single locks of the Erie canal passes 116 boats in 15 hours, a lock little more than half the width will easily pass 200 boats per 24 hours, and is abundantly adequate to the trade of any canal likely to exist in this country. The English canals, with a small amount invested in their construction, accommodate an immense traffic, and are as valuable to their proprietors as they are useful and honorable to the country. Here the reverse is generally the case. For example, the Genesee valley canal will cost about \$60,000 per mile, the cost of the Lowell railway, the best in America; the income of the former is estimated by its friends at one-half of one per cent. per annum, the actual income of the latter is 15 per cent. Again, one mile of the Cornwall canal in Canada cost as much as fifteen miles of the Champlain and St. Lawrence railway, with cars, engines, buildings and wharves, and it will be fortunate if the income from the twelve miles of canal equal half the revenue of the railway. The two private railways are adapted to the business of their respective localities; viewed in this light, the two government canals are monstrosities of the first order.

The Ohio canal is well worthy of the most serious attention. This work is above 300 miles long, is without a rival, cost only \$4,000,000, traverses the heart of a superb country containing two millions of inhabitants, and connects the two greatest chains of inland navigation on the face of the globe—the Ohio with the lakes. Yet the gross income last year was only \$322,754 82, yielding, according to the commissioners, “4½ per cent on the cost of the canal.” Had not this canal been constructed at the moderate cost of \$13,000 per mile, it must have been supported by taxation, as is now the case with the other canals of that State, for some of which money has been borrowed within a few years at 7 per cent! though their sources of income are far inferior to those of the Ohio canal, which, in fact, ranks next to the Erie canal. Ten years’ experience on this canal demonstrate, in a manner admitting of no cavil, that the wealthy and—for America—populous region of Ohio barely supports one of the cheapest, if not the very cheapest canal in the country. The Erie canal has been a complete “ignis fatuus” to the other States, having been paraded before the country as a work which had cleared its prime cost, when in fact it was in arrears for interest. The singu-

lar advantages of the position of the Erie canal, its heavy grants and peculiar privileges render it a dangerous, a ruinous precedent. The following extract from Hunt's *Merchants' Magazine* for August, 1843, gives a general view of the causes which prevent the success of canals in this country:

" Well projected railways claim the favorable attention of the merchant, because they offer safe and profitable investments, besides aiding commerce generally by their unrivalled facilities. They are peculiarly adapted to this country, where the population and business are so scattered, and where capital is not abundant. Unlike canals, the cost of a railway may be adapted to the trade. In most parts of the country a railway can be put into operation for about \$20,000 per mile, including engines, cars, buildings, etc., for a single track—less than half the average cost of the Chenango, Black river and Genesee valley canals, without boats, buildings, horses, etc. Again, a railway carries passengers as well as freight, and both throughout the year; so that, with less than half the cost of the canal, its receipts are several times greater. It is on this account that canals must be constructed as cheaply as possible, to have any chance of success here. Even in a mineral region—the most favorable of all—their being useless half the year is an insuperable objection; and this again becomes intolerable when advancing civilization renders a communication, open throughout the year, indispensable to the community. It appears, therefore, that three vital obstacles to the success of canals exist: their enormous cost, compared with railways, their small income, their being closed nearly half the year in this wintry region. The two last objections are insuperable, and will as effectually deter individuals from embarking their own means in canals as would the first. With politicians, spending the money of the public, the case is reversed. They uniformly prefer those works which require the largest expenditure and the longest time to execute, these two conditions furnish the best "opportunities." The \$20,000,000 spent in this State, on works which can never be required, afford only too true an illustration; but the course of the Canadian government, for the last two years, distances the wildest visions of the wildest western States, even during the phrenzy of '36."

" The railways diverging from Boston in all directions, which have been projected, executed and managed by companies, form the only successful system of public works on this Continent, and would command a large advance on their total cost."

The railways of the United States were undertaken, principally by individuals, after the canals, and though nearly one hundred millions of dollars have been invested in them, they yield about five per cent. The railways of England—the most extraordinary works the world has yet seen, and exclusively the results of private enterprize—have been constructed within fifteen years, at the enormous cost of £52,000,000, and yield a fair return on the capital. It is obvious, therefore, that their sources of income differ materially from those of canals—in other words, that, though both may succeed, a railway may flourish where a canal cannot exist. For example, the Middlesex canal has been abandoned, and its place supplied by the Lowell railway.

The trade of the canal between Liverpool and Manchester has increased since the opening of the railway between those points. When the population and trade of this country shall approach those of England, it is not impossible that canals of reasonable dimensions, cheaply constructed, may succeed in some of the more southern States.

\* To prevent erroneous conclusions, it may be well to state that the resources of a British Province differ materially from those of a State. The former has the duties Imperial as well as Colonial, and contributes nothing to the support of army and navy; it has also the public lands. Hence Canada, as a Colony, bears an expenditure, which, as a State, would be entirely beyond her ability. For several years no statements have been published from which the true state of the finances of the Province, and consequently of the public works, could be gleaned. But the remarkable man now at the head of the government will unquestionably force from the Board of works something definite and tangible, and, I will venture to predict, that a clear straightforward statement of the sums actually expended, i.e. probable—not estimated—amount required to complete the works as well as their present and probable future income, will literally "astonish the natives," who will at once wake up from their poetical discussions of colonial abstractions to the thorough conviction that the utmost efforts of their able governor, as well as of themselves, will be required to counteract, even in a small degree, the withering influences of a debt contracted for the most visionary purposes—a term, I fear, far too mild. There is, of course, little probability that the works commenced will ever be completed.

The public are just beginning to appreciate the losses sustained by the five months' annual sleep of the canals, and the papers from Boston to Detroit have, during the past winter, teemed with invectives against the law of New York which actually denies to the farmer that which the State of Maryland accords to the slave—the right to send his produce to market in any way he pleases—by turnpike, railroad or steamboat. But not only do the canals furnish a tedious route during a little more than half the year, but that very circumstance tends to raise the cost of that inferior accommodation, for the cost of maintaining them would be nearly the same were they open throughout the year, and the income would be greater; the same capital and annual expenditure would yield double the income.

The advantages of the Erie canal in a military point of view have been painfully dwelt on. Yet it can never be more than a very humble auxiliary of the private railways from Albany to Buffalo during the summer months, its opening being too late and its closing too early to render it of any value at the most important moments—the commencing and closing of a campaign. More than this, these very works have been built in spite of the canal interest which is still an incubus on the spirit of honest enterprize. Again, the Rideau canal is a truly military work, yet a railway from Montreal to Kingston, at a cost of four millions of dollars, would, in the event of war, save more than this sum annually, and would render that portion of the province impregnable to any force likely to be brought against it. It would also clear expenses, and three or four per cent. even now. So with regard to Buffalo, a force overwhelming from its numbers could be collected there in a few days. During the late insurrections in Canada the £40,000 sterling, invested by a few individuals in the Champlain and St. Lawrence railway, contributed materially to the defence of the province, while the millions spent on the Imperial and Colonial canals were absolutely useless. In case of a protracted contest the canals would of course come into play to some extent.

The main "causes of the general failure of the canals" of this country may be ascribed to their being closed nearly half the year; to the small amount of business their peculiar accommodation enables them to command in a thinly settled country; to their low rate of speed, and to their—with few exceptions—great cost. Whether these objections are likely to be overcome to any extent worthy of notice, the reader must decide for himself. For my own part, I doubt whether the canals, from the St. Lawrence to the Mississippi will, ten years hence, have yielded one per cent. on the capital invested in their construction; and, omitting the Erie, Ohio and the two private canals referred to above, I do not believe the others will, during that time, clear repairs and renewals: in other words, that their failure will be complete and will in some cases lead to their abandonment.

Since the above was written, I have seen the report of the canal committee to the senate, doc. 98, 1844, which, with that devotion to principle, so prominent a trait in the American politician, according to de Tocqueville, is

very severe on those projects which have become decidedly unpopular—the lateral canals and the enlargement—but says not a word of a vastly greater evil, the canal monopoly. The arguments against any further expenditures are part of those used by others, myself among the rest, some years since, when twenty of the present debt of twenty-eight millions might have been saved. There is, however, a good illustration on page 15, where, speaking of the Chenango canal, it is said—“Thus it is seen, it would have been cheaper for the State to have made a road and hired teamsters at expensive rates to transport the produce of that country in ordinary wagons; and the community would have had the free use of the road for common purposes.”

I made a similar calculation some years since. The expenses and interest on the cost of the Cornwall canal, twelve miles long, will be \$8,000 per mile, and we will assume that it will clear \$1,000 per mile per annum besides paying repairs and renewals—of which there is little probability. Then two years' interest or \$16,000 per mile, will build and equip a good railway, and three months' interest, or \$2,000 per mile will clear *all* the expenses of several times the total down as well as up-freight of the St. Lawrence, and of ten times the present number of passengers. In other words, the entire trade and travel in both directions would be free, and the province would save \$5,000 per mile per annum, or \$60,000 on twelve miles of canal. The interest on the actual cost of the Cornwall canal, and on the estimated cost of the short canals round the rapids above, would pay all the expenses of a continuous railway carrying more freight and passengers than will probably be found on that route twenty years hence: that is, the mere interest on the cost of the canals would pay for free travel and transportation on a railway.

“Now it is obvious, that such men as Brunel, Stephenson, Walker, and a host of others in England, and we are proud to say, not a few in this country, whom we do not feel ourselves at liberty to name, are found utterly impracticable in such cases, and they are consequently avoided with as much care by the projectors of works to be built on the credit of the government, as they are zealously sought for by those who project works to be executed by the expenditure of their own actual capital. The evil of employing men incompetent from want of education, practice and character eventually recoils on the State; hence the financial difficulties of all the States who have largely embarked in the construction of public works.” (Railroad Journal, 1839, p. 354. C. E. & A. Journal, vol. iii, p. 122—London.)

*New York, May, 1844.*

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“Two schooners arrived at Oswego on the 9th, from Toledo, via the Welland canal, with 11,000 bushels of wheat, to Carrington and Pardee, millers there, who, we dare say, will have it made into flour, and ready for this market before the canals are open.” (N. Y. Journal of Commerce.)

Many of our readers will remember an article on the “Spring Trade,” written by Mr. Casey for this Journal, April, 1842, in which he shows the great superiority of the route *via* the Welland canal for early freight; and here we have cargoes *landed* at Oswego long before the *opening* of the Erie canal at Buffalo. The Welland canal was opened on the 2nd April, and merchandize from New York and Boston would have been “afloat on lake Erie,” and “if the people were allowed to choose the mode of transpor-

tation according to their own ideas of their own interest."—*Journal, April, 1842, p. 246*—goods would have been landed at Detroit and Chicago a month earlier than they will be *via* the Erie canal.

In his article on the "Canals of Canada,"—*Journal, Nov., 1842, p. 158*—Mr. Casey expresses his belief that the Welland canal "will eventually cease to be a burden on the province." Without offering any opinion as to the time when this is to take place, which Mr. Casey considers tolerably distant—very safely, too, according to our views—we propose, after his example, and that of the canal commissioners, to make a calculation also. This canal is *estimated* at above \$100,000 per mile, and is about 40 miles long. Total cost \$4,000,000! One million of dollars will construct and furnish a first rate single track, and the interest of the remaining three millions will pay all the cost of carrying 300,000 tons of down freight, and 100,000 tons of up freight. We do not know the tonnage of that canal, but think it will scarcely exceed our estimate for some time to come. However useful this work may be to New York and some of the western States, we see little probability of its becoming what Mr. C. calls a "successful work," a term which ought to be applied to no work which does not yield a fair revenue to its proprietors, as well as contribute to the accommodation of the public.

#### COST OF TRANSPORTATION ON RAILROADS.

The statement marked C, accompanying the "reply," of the Baltimore and Ohio railroad company was intentionally omitted; it being only designed to show how the increase in the coal trade may be provided for out of the profits arising from that branch of business; but the following estimate of the cost of transporting coal from the mines to Baltimore, a distance of 188 miles should have been given in its proper place following estimate B. It will not, however, we trust, be overlooked by our readers, even thus detached, as it gives a concise, yet clear statement of the cost at which heavy freights may be transported over railroads, with grades even greater than were, a few years ago, deemed passable by locomotive power.

These replies ought to be extensively circulated by the friends of railroads; and more especially in this city, at this time, when an appeal—not the last, however, even if unsuccessful—is about to be made in behalf of the NEW YORK AND ERIE RAILROAD—a work from the completion of which every *property* holder—every *business* man—every *carman* and every *day laborer* has a *direct* and *deep* pecuniary interest; and, therefore, it is important that they should be able to appreciate the capacity, the facilities and the economy of railroads, when judiciously located between important points. And can a more favorable or judicious location be found than between the city of New York, on the one hand, and lake Erie, on the other? or between the Atlantic ocean and the far and boundless west?

We have not a doubt but that the means to complete this road could be readily obtained in this city alone, and without delay, if our enterprizing Boston friends would favor us with the *loan* of their noble "Western railroad" for a few weeks, that our cautious citizens could see and *feel* its ope-

rations and its influences—or, indeed, if the facts, contained in this one number of the Journal alone, could be *generally* read and *duly appreciated* by all, the entire amount required would be forthcoming, and the work would be completed in less than three years—as we confidently predict that it will be in less than five.

[ D ]

*Estimated cost of transporting coal from the mines in the vicinity of Frostburg to Baltimore, distance 188 miles—supposing the use of locomotive engines of 20 tons weight, and of sufficient power to carry 25 cars containing 7 tons each, or 175 tons to the train—three locomotives being required to do the work of two, 300 working days during the year, and that equivalent to four days will be required to make the round trip.*

Interest on 6 locomotives and tenders at \$10,000 each per round trip of 4 days,	\$12 00
Repairs and renewals of locomotives and tenders at 9 cents per mile, run 376 miles per round trip,	33 84
Fuel per round trip, 15 tons at \$2 per ton, averaged Harper's Ferry,	30 00
Oil for engine and tender per round trip, 6 gallons at 90 cents per gallon,	5 40
Wages of enginemen and firemen,	14 00
Wages of breakmen,	9 00
Interest per round trip on 200 cars at \$380 each,	15 20
Repairs and renewals of cars at 1-4 of a cent per ton per mile of load hauled, (32,900 tons per mile,)	82 26
Grease for cars,	6 00
Add for use of auxiliary engine at Parr's Ridge,	12 60
And we have as the total amount of the round trip,	\$220 29
Being at the rate per ton per mile of	0 670 cts.
To which add for wear and tear of railway at 1-4 of a cent per ton per mile west of Harper's Ferry, and 45-100 of a cent per ton per mile east of Harper's Ferry, averaging on the whole distance,	0 337 "
And for contingencies,	0 100 "
Making the total cost per ton per mile,	1 107 "
At 1 1-2 cent per ton per mile, and 10 cents extra charge for transportation through the streets of Baltimore, the charge for conveying a ton of coal from the mines to the city block in Baltimore would be	\$2 92
And the annual nett revenue of the company on the amount of trade assumed in this estimate	\$38,789 10
At 1 1-3 cent per ton per mile and 10 cents extra, as in the former case for conveyance through the streets of Baltimore, the charge for transporting a ton of coal from the mines near Frostburg to the city block in Baltimore, would be	2 61
And the annual nett revenue of the company on the same amount of trade,	\$22,306 20
The amount of investment in machinery to accommodate the trade above assumed would be,	\$136,000 00

Respectfully submitted,  
JAMES MURRAY, Engineer of machinery and repairs.

February 13th, 1844.

I have carefully examined the preceding estimates and have confidence in their sufficiency for the purposes intended

BENJ. H. LATROBE, Chief Engineer.

#### NEW YORK AND ERIE RAILROAD.

The time has arrived for *every man*, who desires the completion of this great work, to put his shoulder to the wheel, or take a pick axe and shovel and go to work in earnest. Annexed will be found the candid, manly, and earnest appeal of the company to the *citizens* of New York individually, for aid in its completion. In giving place to this appeal, we cannot withhold the expression of our surprise that a work of such vast importance to this city should be looked upon with so much apathy and distrust by its citizens; and its friends be compelled to solicit, and urge those who are to be

so largely and so *permanently* benefited by its completion, to contribute the means for its construction; nor refrain from earnestly urging those who can possibly do so, to come forward and subscribe for stock, at least a few shares, if they cannot for many. Every owner of *real estate*—every *merchant, manufacturer, mechanic* and *carman*, and even many day laborers will promote their own permanent interest by *taking one or more shares*, and thus aid its early completion, even if he never receives a penny in the way of dividends. Its completion will benefit New York as much or more than the construction of the Erie canal did. Its influences will be more universal, as every poor family, using only a quart of milk daily, will save *two cents* at least each day—or \$7 30 a year; and at the same time obtain a better article. And so with *butter*, and many other articles of *necessity* and *comfort*—the prices will be materially reduced in consequence of the increased facilities for bringing them to the city. The saving to the inhabitants of this city alone, upon the *necessaries of life* cannot be less, when the road shall be completed, than *half a million* of dollars a year. This, however, is but one item in the list of benefits which will surely result from its early construction. Others, equally important, will follow, in the increased value of property in the city, and along its line, to the amount certainly—by the time the *first car* shall pass from the Hudson to lake Erie—of *twice* the entire cost of the road. Is it not the duty, then, of those who are thus to be benefited, to respond promptly to the call of the company, by subscribing for such an amount of stock as they may be able to pay for, without interfering with other business arrangements? We think it is, and believing so, shall act accordingly, and charge the *Journal* with at least *one* share, and more if we can do so. *Let others go and do likewise.*

ADDRESS TO THE PUBLIC, OF THE NEW YORK AND ERIE RAILROAD COMPANY.

Office of the New York and Erie Railroad Co. }  
New York, 11th April, 1844. }

The common council have declared by resolution that it is not expedient that the city of New York should subscribe to the capital stock of the New York and Erie railroad company, and having declined to unite in the application to the legislature, the directors are under the necessity of opening the books for private subscription without the important aid which the corporation of the city would have afforded.

With their convictions as to the importance of the road, the amount of capital required, and the principles on which alone the board were willing to undertake its completion, they could not consistently decline to bring forward the question of a city subscription. At the same time it was felt that the great responsibility involved in the decision of that question should not rest with them even indirectly, but belong either to the common council, the legislature, or the people.

By the course pursued, the question could not reach the people without the sanction of the common council, and the authority of the legislature. That sanction having been refused, the application to the legislature will not be made; and the completion of the New York and Erie railroad now depends entirely upon the amount that can be obtained by private subscription.

Before determining the conditions, on which books of subscription to the

capital stock are to be opened, the board have again had under consideration the position assumed in their report, that six millions of dollars are necessary before the work should be resumed.

After much deliberation, the board continued of the opinion that the conditions of the subscription should require that the amount to be subscribed before the resumption of the work, should be such as would place the completion of the road beyond ordinary contingencies; and they cannot satisfy themselves that a smaller sum than six millions will comply with this condition.

The board have not overlooked the important considerations which induce many to believe that a smaller sum in connection with the other resources of the company would be adequate; but those considerations, in their opinion, are not sufficient to remove all reasonable doubt; and no other basis would be consistent with the views of the board, the responsibilities of their position, and the principles on which they consented to undertake them.

In their anxiety to remove every circumstance which may have an unfavorable influence on new subscriptions, the board have been constrained to discriminate between old and new stock, and that this may be effected without permanent injury, if any, to the interests of old stockholders, it has been done in the manner stipulated in the conditions of subscription.

The priority of dividend thus to be secured to the new stock is made dependent on the action of individual holders of stock already issued, in consequence of the legal opinion that neither the board of directors nor the stockholders legally convened, possess the power to make any distinction between stocks issued at different periods.

In accordance with these views, the following are the conditions under which the subscription books are to be opened.

"We, the undersigned, respectively subscribe for the number of shares of the capital stock of the New York and Erie railroad company, of one hundred dollars each, set opposite our names, and hereby agree to pay ten dollars on each share within twenty days after the closing of the books, and the subsequent instalments as they shall be legally called for, provided,

1st. "That bona fide subscriptions subsequent to 1st of March, and prior to 1st of August, 1844, shall amount to the sum of six millions of dollars.

2d. "That the instalments shall not exceed thirty-three and one-third per cent. per annum.

3d. "That by the individual acts of at least three-fourths of the amount of stock issued prior to the 1st of March, 1844, it shall be legally established, that dividends when made shall be declared on the following basis:

1st. "That the right of dividends on at least seventy-five per cent. of the old stock shall be deferred until a dividend of six per cent. shall be declared on the new stock.

2d. "That when the nett earnings shall exceed the amount necessary to pay such dividend to the new stock the excess shall be appropriated to dividends on the old stock.

3d. "That when dividends so declared on old stock amount to six per cent. per annum, the old and new stock shall be put on a par, and all distinction between them shall thereafter cease."

The board have the satisfaction of believing that the great question of the completion of the New York and Erie railroad is now before the citizens of New York, and of the counties interested in its construction, freed of all extraneous considerations; that public attention has been fully drawn to the subject, and that there prevails throughout the community an appreciation of the importance of the road, and a confidence in its success when completed to lake Erie, that are of the most encouraging character.

The board will adopt all suitable measures to obtain the very general action on this subject, which the large amount to be raised renders necessary, and trust that their efforts will be efficiently seconded by all who unite with them in opinion that the completion of the New York and Erie railroad, while it affords every prospect of remunerating dividends to stockholders, will be of great and permanent benefit to the city and country.

HORATIO ALLEN, *President.*

JAMES BROWN, *Vice President.*

D. A. Cushman, C. M. Leupp, Harvey Weed, F. W. Edmonds,  
Silas Brown, A. G. Phelps, Theo. Dehon, Matthew Morgan,  
P. Spofford, John C. Green, Wm. Maxwell, A. S. Diven,  
Elijah Risley.

For the American Railroad Journal and Mechanics' Magazine.

SCHUYLKILL NAVIGATION.

*Failure of Railways.*—It is still maintained by a correspondent of the Journal, "X," that it is very impolitic to graduate the capacity of a railway or canal with any reference to the trade which it is intended to accommodate; or, as he characteristically describes the principle, to *measure* the probable tonnage, for the purpose of determining the capacity of the railroad which is to convey it, as you would individuals for their clothes—varying the size with the circumstances of the case. He proposes, as the true principle of tailoring, to put a man's suit on a boy, and a woman's dress on a baby; and calls up the Schuylkill navigation in illustration of the soundness of his views.

The example will be found to be very unfortunately selected, for the object at which this writer seems to be aiming.

The Schuylkill navigation was constructed between the years 1815 and 1825; and we believe has been prosecuted on those common sense principles which have been recommended by Mr. Ellet for the construction of railways. It was made at first on a small scale—because the trade was expected to be small at first—and with a view to its gradual enlargement—because the trade was expected to increase.

In 1826 the depth of water was but three feet, and barely adequate to the passage of boats of 25 tons burden. The purpose of its projectors was fully answered. The canal soon *created a trade*, and that trade increased sufficiently to justify the anticipated enlargement of the channel. From year to year the capacity of the work has been augmented, until it now permits the ready passage of boats of 60 tons burden, while occasionally more than 70 tons have been carried upon it.

The Schuylkill navigation company have expended in the construction and enlargement of this canal the sum of \$3,456,620.

Their aggregate receipts from tolls on coal, and other articles,

up to January 1st, 1844, have amounted to - - - - - \$5,641,255

Their aggregate expenses have been - - - - - 1,768,792

Leaving a nett profit of - - - - - \$3,872,463

or \$415,843 more than the whole cost of the work and its enlargement.

Now, these results are pretty fair, and certainly do not, of themselves, authorize a condemnation of the present course which the managers of this work have adopted.

But the Reading railroad company, it is contended by "X," have adopted a different plan—that of making a very expensive road at the outset. Let us see how their method works.

The Reading railroad is now new, and, together with all its machinery, ought to be in perfect order. It was in full operation last year, and carried about 230,000 tons of freight, and some 26,000 passengers.

The company expended during the year,	\$1,800,000
And received for freight and passengers,	385,000
And exhibited, at the close of the year, an excess of expenses beyond their receipts of	\$1,415,000

Of this sum just \$212,000 was expended for new cars and engines, and about \$90,000 for new work on the road. The balance of about \$1,100,000—of the sum by which the expenses exceed the receipts—appears to have been consumed in conveying these 230,000 tons of coal. At any rate, no other explanation of its disappearance has ever been offered.

Our friend "X" speaks with some severity of certain *slanders* against the Reading railroad, which, he says, have appeared in the Philadelphia newspapers; and charges us with wishing to give them greater circulation. We are sorry to learn that this company has been slandered by any body; and we do assure him that if they have suffered in that way, we have had no part in it, and have never before heard of the circumstance. It is true, we have read some very severe and scourging strictures on the conduct of the institution, in the columns of the "Pennsylvanian," "Ledger," and "North American"—but we always supposed that they were true. Certainly, nobody in Philadelphia doubts their truth, nor has any person yet ventured to come forward and attempt to disprove them.

But "X" is chivalric, and we shall look to him to tell us, specifically, what the Reading railroad company did with the \$1,800,000 which they spent last year.

For ourselves, we wish not to injure this company, but we wish to make the truth known; and we supposed when we exhibited the strong comparison drawn by "X" himself, in the strongest possible light, we were doing good service to his hobby. This, it will be recollectcd, is his language.

"Still another comparison may be made between the Schuylkill canal which cost \$38,000 per mile, without boats, and the Philadelphia and Potowmille railroad, which costs \$50,000 per mile, with cars and motive power." "Is it not," says X, triumphantly, "is it not this additional cost which makes it the superior and cheaper work of the two?"

Now, I say, the great merit of this road was, in the opinion of "X," its great first cost; and I was justified in supposing that I was giving most gratifying information, when I informed him that it had, on the 18th December last, increased this merit to \$76,000 per mile. What its merits will amount

to at the end of this year, it is not easy to say—but it is probable that it will exceed \$100,000 per mile—and I congratulate "X" on the proof which this fact furnishes of the great success which is in store for this great enterprise.

Y.

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#### EULOGIUM ON ENGINEERS.

The last number of "The Westminister Review" contains a very able article on the "Progress of Art," in which the writer complains of the want of originality among the architects of the present day, though he at the same time does justice to their merits. He points out several radical defects in the new houses of parliament, but intimates a doubt whether any other architect would have done better, evidently considering the profession in too low a state to undertake works of the first order. He says,

"It has been lucky for us that the ancients have left us fewer examples of their engineering works than productions of their architects. Our medieval ancestors indulged but rarely in roads or bridges, and besides this, the exigencies of locality, and above all the exigencies of estimates, which are usually carefully looked at in the utilitarian works executed by our engineers, have allowed them less temptation to copy, and less means of doing so than their brother builders, and the consequence is that they may challenge Rome, or the whole world to match either the magnificence or the taste of our public works. It is true we possess some 'truly Roman works,' the taste of which is very questionable; and both Blackfriars and Waterloo bridges narrowly escaped being spoilt by the interference of the architects, who fortunately, however, have left nothing to mark their presence but the absurd Ionic, and the Grocian Doric columns that stand on the piers—in the one case supporting an enormously heavy granite parapet, and in the other in company with a most incongruous Roman balustrade. But since those days the engineering interest has acquired a predominance which enables it to walk alone; and in London bridge they have produced a specimen of bridge building, perfect in all its parts, and as yet unrivalled in the world, and this simply because there is not one detail copied from any other bridge, not one ornament applied that had not a meaning, nor one thing added that was not seen to be wanted by the sound sense and mechanical knowledge of its builders; yet there is a magnificence in this bridge amounting even to splendor, and could we point to one building in Great Britain built on the same principles of sound common sense, we should probably have to apply it to the same epithet.

"The names of Watt, Brindley, Smeaton, Telford and Rennie, or of our Stevensons, Brunels, Lindleys and Clegges, are names to which an Englishman refers with pride, and stand in strong contrast with those of their contemporary builders of the present day; the former have contributed, as much as almost any class of men, to the advancement of civilization, and to the glory of the nation, and may almost be said to have created an art which is daily becoming of more and more importance. The latter, on the contrary, have done nothing to which we can refer with unmixed satisfaction, and much that has made us a laughing stock to surrounding nations.

"They have created nothing and advanced nothing; yet so closely do these professions approach at some points, that it is difficult to draw a line between them, and to say what works belong to one, and what to the other; but their mode of treating their subject differs as light does from darkness. The one admits of no rule but fitness and propriety, and the dictates of reason and common sense; the other, copying and dissembling, never thinking of what is most fit or most useful, and worshipping the shadow of exotic art.

"Such an impulse has lately been given by our railways and canals to the science of engineering, that it now occupies almost as much of the public attention as architecture, and there is more probability of this influence increasing than diminishing, we may hope that the sound principles which have enabled engineers to execute such satisfactory works may extend to our architects, and that we may soon see some improvements in their designs; but much ignorance and long rooted prejudice must first be conquered, and, above all, the patrons of art must learn to take more interest in the subject than they have hitherto done, and to think more for themselves."

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The Portamouth (Ohio) Tribune says, that "Leander Bansom gives notice that the canal will be open its entire length on the 15th inst. We understand that double sets of hands are engaged on the culvert about six miles from Portamouth, and the work is prosecuted both night and day. It will probably be completed in 6 or 8 days at farthest."

## NEW YORK AND ERIE RAILROAD.

A large meeting of highly respectable citizens was held last evening at the Tabernacle, to devise means for aiding and urging on the construction of this important work. The following gentlemen were chosen to preside:

President,

GEORGE GRISWOLD.

Vice Presidents,

James Harper,  
John A. King,  
Thos. Suffern,  
C. W. Lawrence,  
Jas. Donaldson,

Wm. Tucker,  
Jas. Boorman,  
Robt. Smith,  
G. G. Howland,  
Saul Alley,

John H. Hicks,  
J. DePeyster Osgood,  
P. S. Van Rensselaer,  
Jacob Little,  
R. J. Carman,

Moses Taylor, Wm. Burns.

Secretaries,

Charles McVean,

James Kelley, Charles Dennison,

Isaac Townsend,

Chas. P. Brown.

Mr. JOSEPH BLUNT addressed the meeting in an earnest manner—urging the speedy construction of the road, and illustrated its importance to this city with the following, among other forcible arguments:

"The annual consumption of provisions by our city, amount in value to some \$15,000,000, and many of the articles are furnished by the region bordering on the line of the Erie railroad more advantageously than from any other quarter—for instance, beef, of which the annual consumption is \$1,500,000, and milk, of which the annual cost is about \$1,000,000, one-third of which will be saved by the Erie railroad. The receipts of veal, poultry, game, butter, cheese, etc., by this road are already very large—of veal, 600 tons last year; of game, 1000 tons; of milk, 5000 tons, etc. All these articles have been cheapened to our city by this road, and the aggregate saving can hardly fall below \$1,000,000 per annum, and, if the road were completed, would be nearer \$2,000,000. If, then, this work would not pay any dividend, it would still be incumbent on us, and our obvious interest, to complete it."

Mr. Blunt closed his remarks by offering several resolutions for the appointment of a committee in each election district, and among the various professions and trades in the city with a view of presenting the subject in such a manner that every person may feel an interest in, and contribute to its success.

Mr. M. C. PATTERSON followed Mr. Blunt, and gave a glowing picture of the advantages to result from an early completion of the road. The following extracts from his remarks ought to be read by all who feel an interest in the progressive prosperity of our city. After referring in a proper manner to the present able board of directors, he says,

"They had found, after careful scrutiny, that the property of the company is now worth \$4,000,000, and that \$6,000,000 more will complete the work. Shall it not be completed? New York, lately so eminent, now labors under serious disadvantages in competing with her rivals for the trade of the mighty west. Boston, by means of her Western and other railroads, always in operation, presses her hard on the north. Philadelphia, by her vast net work of canals and railroads, enjoys decided advantages on the south. The milder climate of Pennsylvania secures to her three weeks' earlier opening and a week's later closing of her canals, as compared with those of our State. This year a boat from Ohio had reached Philadelphia three weeks before our canals opened. Baltimore is pressing forward with still greater advantages of climate. Charleston has also made a spirited attempt to pierce the great valley of the west. Can we afford to stand idle?" \*

"The 53 miles of the road now completed, running in good part near the Hudson, and forced to maintain a sharp competition with that cheap route, gave last year an income of \$101,000, netting \$46,000 over current expenses, from an area of 440,000 acres, having a population of about 40,000. Allowing the road when completed to yield in like ratio, and even reducing the nett product of last year one-third, or from \$46,000 to \$30,000, since it is found that some 12,000,000 acres (equal to the area of Connecticut, Rhode Island and Massachusetts) become directly tributary to this road on its completion, the annual earnings of the whole road must amount to \$1,372,000! or no less than 15 per cent. on the capital invested!"

Wm. B. OGDEN, Esq., of Chicago, also addressed the meeting—giving an interesting description of the growth and resources of the west; and of the interest felt by the people of that vast region in the success of this work—assuring the meeting that, if able, they would construct it at their own expense rather than have it fail.

The meeting was large, and appeared to be animated by the right feeling; and it is to be hoped that a similar spirit may be soon found to pervade this entire community.

The report of the directors published in February last ought to be in the hands of every business man in the city. The following synopsis of it gives its prominent points, and it should be read with care—and then there port itself should be examined.

SYNOPSIS.

The length of the road is 451 1-2 miles—64 miles of which are finished, and 53 miles in actual operation.

177 miles have been graded and bridged, and are ready for the superstructure.

The exact location of 350 miles has been determined on, and the right of way for 325 miles obtained.

The whole amount of expenditure upon the road is \$4,716,872 66.

The whole amount of capital stock subject to dividends is \$1,501,830 14.

The total amount of the indebtedness of the company is about \$600,000.

The total cost of completing the road is estimated as follows:

For completing the track for use,	\$6,000,000
The outfit for commencement of business, viz: for depots, water stations, engines, cars, etc.,	1,000,000
Making the whole sum required,	\$7,000,000
To which add amount of indebtedness,	600,000
"    "    "    "    capital stock,	1,501,830

Making the total amount of capital stock when the road is completed, - \$9,101,830

The board estimated that the property which this capital stock will own, could not have been acquired for less than 11,000,000 dollars.

The report is accompanied by a map delineating an area of country which will be tributary to the road in its transportation of freight and passengers. That area embraces about 12,000,000 acres and contains a population of 531,000 inhabitants.

The population tributary to the Erie canal in 1820 was 521,311, and in 1825, when it was first opened, 681,725.

The area of Massachusetts, Rhode Island and Connecticut is 8,660,000 acres, and the amount expended for railroads in those States is 25,000,000 dollars.

Of the indebtedness of the company the report states that the only sum which can embarrass its operations within five years has been reduced to less than 100,000 dollars, and that the board has succeeded in obtaining a surrender of the assignments and in recovering possession of the road and the other property of the company; and although "some difficulty may still grow out of the indebtedness not settled, yet, trusting to the assurances given by the parties almost without exception to extend to the company all the time that the ultimate security of these debts will permit, the board believe that it will be possible to make arrangements that will prevent any embarrassing prosecution of the claims during the period that measures for the resumption of the work are under consideration and action."

The company has also been relieved from all connection with past contracts and questions of damages.

During the year ending the 1st April, 1844, the total nett earnings of the 53 miles in operation from Piermont, on the river, to Middletown, in Orange Co., 7 miles of which was not completed until June, 1843, will be 46,800 dollars, making a reasonable estimate for the last two months. The extreme end of this portion of the road is only 20 miles from the river, and the whole 53 miles, therefore, subject to great competition, which diminishes, and finally ceases, as the road penetrates the interior.

"The board agrees with those who have preceded them in similar investigations, in considering that the population, products and area of the country, whose travel and transportation can be commanded, form a basis of calculation of all others most to be relied on."

They therefore present tables of articles transported during six months ending September 30th, 1843, over the 53 miles in use; and the table, compiled from the last census of the United States, of the population and products of the counties tributary to the road.

From these tables it has been inferred that about one-fourth of the nett earnings are of a local character, and that the surplus products in proportion to the population, fully equal those of Orange and Rockland. To enable a calculation of the probable productiveness of the road to be made on the basis mentioned, the entire area of country through which the road passes, has been subdivided into districts, whose centres are successively 50 miles apart on the line of the road, and the area and population of each district have been ascertained, upon which principle a calculation is thus illustrated:

1. The total amount of nett earnings from a population of 40,000 being 40,000 dollars; 30,000 may be taken as the basis of the calculation.

2. Instead of taking the full amount that might be deducted from the calculation of relative population and distances, two-thirds of that amount is assured.

And the result is the sum of \$1,343,500 as the total nett earnings of the whole road, which is equal to a revenue of 15 per cent. on the total amount of capital.

The revenue that is expected to accrue from the transportation of the mails, and which will not probably be less than 100,000 dollars per annum, is not included in the above nett earnings. Neither is an allowance made for the increase of population; the business that must inevitably be brought to the road from the lakes; nor the diminished expense of transportation as the length of the road is increased.

The exports and imports of Buffalo during the year 1843, were 23,700,000 dollars.

It appears that passengers can be conveyed by this road from lake Erie to the city of N. York, in from 24 to 26 hours at a charge of 10 dollars each, and will afford a profit of from 3 to 5 dollars; that light freight can be transported in the same space of time, and heavy freight in from 48 to 50 hours, yielding a profit at low rates of from 3 to 10 dollars per ton. Passengers are now conveyed from Buffalo to New York during the summer in from 35 to 40 hours at a charge of \$11 50, and during the winter by the Housatonic railroad in 40 hours, at a charge of 16 dollars, both exclusive of expenses on the road; and from Buffalo to Boston in 36 hours, for 15 dollars.

During the six months ending Sept. 30th, 1843, 3,000,000 quarts of milk—equal to 6,000,000 dollars per annum—were brought over the eastern division of the road, for which the consumers paid 4 cents a quart. Before a supply was obtained through this source, the average price was 6 cents a quart; an annual saving is therefore effected to the city on the amount brought, of 120,000 dollars; estimating the whole consumption of the city at 16,000,000 of quarts, the saving on the whole would be 320,000 dollars.

A table is given, showing the amount of country produce annually consumed in the city of New York, the value of which is put down at 15,500,000 dollars.

The whole amount that will be required to complete the road is 7,600,000 dollars; and with respect to the method of raising that sum the directors remark, that "the act of 1843 authorizes the company to issue bonds to the amount of 3,000,000 dollars, which resource, however, will not be an available one until further expenditures on the road shall make the property of undoubted security to the bondholders; nor until the means of paying the interest on these bonds is found within the resources of the company." They "are of opinion that subscriptions to the amount of 6,000,000 of dollars to the capital stock of the company must be obtained before any steps can be taken for the resumption of the work, and that with such subscription the completion of the road is secured with all reasonable certainty."

The road runs within 20 to 30 miles of the great anthracite and bituminous coal region in the northern counties of Pennsylvania.

Access will be had from it to the immense beds of gypsum or plaster, so valuable to the agriculturist, and also to the salt region of Onondaga by the interior lakes of the State, the Chemung canal and the Ithaca and Owego railroad.

At 375 miles from New York the road will connect with the Allegheny river, which is navigable for descending freight during the months of April and May, and by which route merchandize can be delivered in Pittsburgh in about 7 days.

Tables are given showing the immense increase of late years in the tonnage on the upper lakes, and in the amount of property coming from other States and shipped at Buffalo and Black Rock. The number of tons of property that came from other States and was received at these two places increased from 36,273 tons in 1836, to 224,166 tons in 1843.

The board, in expressing its opinion that the New York and Erie railroad will afford advantages not possessed by other avenues, and that its construction is of great importance to our city, enters into an enumeration of those advantages; but as they are too voluminous for a synopsis, the reader is referred to the report itself.

#### IRON SHIPS.

We had the pleasure of witnessing the launch of an iron steam ship, built for the revenue service by Messrs. H. R. Dunham & Co., Archimedes works, under the superintendence of Capt. Howard, U. S. N. The engines are by another firm. She has a single propeller, and is to be full ship rigged. Her model struck us as being remarkably fine, and so just are her proportions, that it was difficult to believe her capacity to be above three hundred tons. We had flattered ourselves with the hope of presenting our readers with a minute account of both hull and engines, but are only enabled to give the former at present, though we hope in our next to give full accounts of several other iron ships, and small craft, now constructing in this port. The following are the dimensions of hull and material:

Length on deck, 140 feet. Breadth, 24 feet. Depth of hold, 11 feet. Tonnage, 340 tons.

The size of the ribs,  $4\frac{1}{2} \times \frac{3}{4}$ ; 20 inches apart from centre to centre; connected to the skin with 3 inch  $\times \frac{3}{4}$  knees, on each side of rib, on every longitudinal seam. The skin of the vessel on the floor and each end including upper streak, is of  $\frac{1}{2}$  inch plates; other parts  $\frac{1}{4}$  inch full.

There are two water tight bulkheads, which include the engine, boiler and coal, making three water tight compartments in the hull. These communicate with each other by means of slide valves, which, in case of leakage, can be instantly closed. Connected with the forward of these are the coal bunkers, which are riveted to the bottom of the vessel and extend upward to the deck, where they are secured to the beams.

The deck beams are of angle iron, 5 inches on one side by  $1\frac{1}{2} \times \frac{5}{8}$  thick, to which the deck is secured by means of bolts and nuts—in a very solid and superior manner.

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TO THE SUBSCRIBERS OF THE AMERICAN RAILROAD JOURNAL.

The undersigned, during his connection with this Journal, having engaged in other pursuits, necessarily occupying much of his time, has been frequently prevented from giving that attention to the work which its interests demand. He now finds it expedient to devote himself entirely to his other avocations, and accordingly, having disposed of his interest in the proprietorship, his duties, as editor and proprietor, cease with the present number.

Having for more than eight years used the editorial *we*, he begs permission, on relinquishing it, to say a few words in *propria persona*. When the undersigned first became connected with this work, the railroad cause was rapidly advancing under the united forces of its own merits, and the common stimulus then operating upon every species of enterprize. That the tide soon turned, we all know—its effects upon the community generally, and upon the railroad cause, will not be soon forgotten. The trials experienced in sustaining the Journal, and the loss to its owners, are fully known only to those most interested—they need not be repeated for the edification of others. Meanwhile the good cause has passed through such an ordeal as seldom tries undertakings of like character; it is now unaided by any undue stimulus, but its own merits are acknowledged fully and universally, and by their help alone it is rapidly entering upon a healthy prosperity. The untiring labors of zealous friends of the cause have successfully contended with the host of adverse circumstances belonging to this disastrous period. To these friends the Railroad Journal has mainly owed its continued existence—not only have they enhanced the value of its pages by their contributions—but encouraged and sustained its publishers by the substantial aid of promptly paid subscriptions.

The undersigned would leave undischarged an imperative but welcome duty, were he to pass by this opportunity of gratefully acknowledging these various acts of kindness, shown to him as connected with the Journal. But more than this he feels bound to say. In his personal intercourse with the members of the profession, and others interested in railroads, he has uniformly received the most courteous treatment, and has, in many instances, been led into association with those whose friendship he flatters himself will outlast his formal connection with the Railroad Journal.

By a transfer of his share of these kindly offices to Mr. Minor, the friends of the undersigned will not only confer a personal obligation, but likewise aid in the just and proper restoration of these favors to their original recipient.

In no way can the well wishers of the Journal render it more important aid than by frequent contributions to its pages, while from the number of those already enlisted among its regular contributors, its increasing interest and value may be found guaranteed.

Although released from all charge over the Journal, the undersigned will remain as much attached to its interests as ever, and also proposes, as far as other engagements will allow, to continue to write for its pages.

In conclusion, the subscriber offers his best wishes for the health and prosperity of the friends, subscribers and worthy conductor of the American Railroad Journal. Long may it flourish. Success to the railroad cause.

GEORGE C. SCHAEFFER.

From the preceding valedictory, the readers of the Railroad Journal will learn that Mr. GEORGE C. SCHAEFFER, who has, for the past eight years, been the principal editor, withdraws from his post. In parting thus with an associate and friend, who so long stood by my side, while I was able to sustain my position; and who, manfully and alone for years, in behalf of the Journal, breasted the storm which prostrated me, with many of its early friends, until I could again come to its aid, with renewed energies, I feel called upon to bear testimony, as well to his uniform kindness and courtesy, in our business relations, as to his ability and discretion in the discharge of his editorial duties. When Mr. Schaeffer first entered upon his duties as editor, the condition and prospects of the railroad system, and hence of the Railroad Journal, seemed to warrant the opinion that his efforts in the cause would meet with a liberal reward; but I regret to say that such has not been the result, and therefore I cannot complain, however much I may regret, that he relinquishes his station to seek another which may yield him a better return; and in taking leave of him as an associate, after so long a period of constant and harmonious intercourse, amid the trying scenes of the past seven years, I cannot refrain from expressing my ardent hope that he may be successful in his present pursuits, even in proportion to his sterling merits—a measure of reward, which, if realized, will yield him all that is desirable in life.

One word, now, in relation to the future course of the Journal. As heretofore, it will be mainly devoted to the cause of internal improvements, and especially of railroads. Its columns will, however, be open to a free and full discussion of the merits of the different systems, and of different works. Truth, being mighty, is sure ultimately to triumph, as I believe railroads are destined to, over every obstacle; and to become, in this country, the bonds of union and the roads to wealth, the increased intelligence and happiness of the people.

Entertaining these views, and believing that we have had, in this country, ample experience, without referring to Europe, to establish their superiority over every other mode of intercommunication, I hope, with the continued aid of those friends, and my late associate, who have labored so ardently for the cause, together with others who have promised their co-operation, to make the RAILROAD JOURNAL the appropriate medium for disseminating the results of the experience of our numerous able and scientific engineers, and machinists; and thus to command the liberal patronage of those whose interests are so largely identified with the system. A few copies of this number will be sent to friends of the cause, in different parts of the country, with the hope of securing their aid in its more general circulation; and should it meet with a cordial reception and prompt return, I shall be encouraged to renewed, and, I trust, successful efforts to make it still more useful than it has hitherto been.

D. K. MINOR.

We have only space to acknowledge the receipt of the report of the Baltimore and Susquehanna railroad company for 1843—the “report of the engineer on the route surveyed for the northern railroad, from Concord to Lebanon, N. H.”—the “proceedings of the stockholders of the Louisville, Cincinnati and Charleston railroad company—and of the south western railroad bank”—and also of the pamphlet of “Examiner,” in relation to the Reading railroad—all of which we shall look into and perhaps refer to again.

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